

one, not only for one of the best summers this century but also, in consequence, for the profusion of many butterflies, in particular the Small Tortoiseshells, Red Admirals, Peacocks and the Chalk-hill Blue in many districts. By far the most spectacular event among the moths, was the great immigration of the Bedstraw Hawk (*Hyles galii* Rott.) which compared well with its major years of 1870, 1888 and 1955. Other migrant species too were well up to average and there was a good reappearance of *Colias croceus*, chiefly in the south-western region.

## A Review of Indian Phytoseiid Mites with a Note on their Zoogeography

By S. K. GUPTA

(Zoological Survey of India, Calcutta-12, India)

Considerable attention has been focussed on the mites of the family Phytoseiidae because of their immense importance as predators and, thus, for their possible utilisation for the natural control of pest species of mites particularly of the families Tetranychidae and Eriophyidae.

The information available on phytoseiid mites in India is scanty in comparison to work done abroad. Narayanan and Khot (1959) were first in India to bring into light the importance of phytoseiid mites as biocontrolling agent when they recorded *Amblyseius cucumeris* (Oudemans) feeding on *Oligonychus mangiferus* on mango. Next year Narayanan and Kaur (1960) described for the first time two new species of the genus *Amblyseius* Berlese. In the same year Narayanan and Kaur (1960a) and Narayanan *et al.* (1960) discussed in detail the important taxonomic characters of the family Phytoseiidae. They emphasized that the number, arrangement, nature, position and relative lengths of setae together with some other anatomical characters are important in the taxonomy of this group. Narayanan *et al.* (1960) also reported 8 species including 3 new ones. Chant (1960) described 4 new species of *Typhlodromus* Scheuten and *Amblyseius* Berlese. Narayanan & Ghai (1963), while investigating into the causes of mango malformation, found some mites associated with this disease. Three of them belonged to the family Phytoseiidae including a new one under *Typhlodromus*. Krantz and Khot (1962) described a species of *Hemipteroseius* Evans. Ghai (1964), while reviewing the work done on mites of economic importance in India, listed 17 species of Phytoseiidae. Ghai and Menon (1967) reported 16 species of *Amblyseius* Berlese including 7 new ones and provided a key for the first time for the Indian *Amblyseius* species.

From the material received from India and Pakistan, Muma (1967) reported 15 species including 8 new ones under the genera *Amblyseius* Berlese, *Typhlodromips* De Leon, *Amblydromella* Muma, *Cydnodromus* Muma and *Cydnoseius*

Table 1  
Zoogeographical analysis of phytoseiid mites so far known from India\*

Genera	Total number of species	Endemic	Oriental	Ethiopian	Australian	Palearctic	Nearctic and Neo- tropical	Cosmo- politan
Amblyseius	36	21	22	5	—	1	3	5
Indodromus	1	1	1	—	—	—	—	—
Indoseius	1	1	1	—	—	—	—	—
Phytoseius	8	4	5	—	—	1	1	1
Typhlodromus	11	7	7	—	1	1	—	2
Hemipteroseius	1	1	1	—	—	—	—	—
Total	58	35	37	5	1	3	4	8
		60.34%	67.79%	8.62%	1.72%	5.12%	6.89%	13.79%

Muma. Of them, only 3 species of *Amblyseius* belonged to Indian subcontinent. Ghai and Menon (1969) erected two new genera, viz. *Indodromus* and *Indoseius* with one new species as type for each genus. Gupta (1969) described a new species of *Typhlodromus* from India. In the same year he (Gupta, 1969a) added 3 more new species of *Phytoseius* Ribaga. Gupta (1970) listed 25 species of Phytoseiidae of which 10 were reported for the first time from this subcontinent. In the same year he (Gupta, 1970a, 1970b) added 7 more new species belonging to genera *Amblyseius* Berlese and *Typhlodromus* Scheuten.

So, by summarising the overall information it appears that only 58 species are known from India which are distributed over 6 genera, viz. *Amblyseius* Berlese, *Indodromus* Ghai & Menon, *Indoseius* Ghai & Menon, *Phytoseius* Ribaga, *Typhlodromus* Scheuten and *Hemipteroseius* Evans.

As regards the Zoogeographical composition, Indian species (Table 1) show high degree (60.34%) of endemism. Among the known species 63.79% constitute the oriental fauna. Of the remaining, 8.62% belong to Ethiopian region, 1.72% to Australian region 5.12% to Palaearctic region, 6.89% to Nearctic and Neotropical region and 13.79% are cosmopolitan in distribution. The cosmopolitan species are: *Amblyseius fallacis* (Garman), *A. finlandicus* (Oudemans), *A. largoensis* (Muma), *A. ovalis* (Evans), *A. cucumeris* (Oudemans) *Typhlodromus bakeri* (Garman), *T. rhenanus* (Oudemans) and *Phytoseius macropilis* (Banks).

Among the genera *Indodromus* Ghai and Menon and *Indoseius* Ghai and Menon are endemic.

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## Local Rarities and New Derbyshire Records for 1973

By F. HARRISON

24 Church Street, Holloway, near Matlock)

Lepidoptera recording in Derbyshire and adjacent areas of the surrounding counties has been carried out during the past year with a greater intensity than usual, by members of the Derbyshire Entomological Society, in preparation for a new publication on the counties lepidoptera. The frequent field excursions, plus an unusually favourable summer, produced some interesting specimens, some of the most important of which are listed below.

*Gonepteryx rhamni* L. is a scarce species in the county though a few are recorded annually, particularly in the south. During 1973 the following specimens were recorded: — one, 8th June, Lathkil Dale (R. A. Frost); one, 16th June, Clough Wood; one, 31st July, Tansley (B. L. Statham); one, 16th May and five during the period 15th August to 19th September in Elvaston Castle Country Park near Derby (M. Tong).